In the Claims

1. (currently amended) A method for determining correspondence between locations on a display surface having an arbitrary shape and pixels in an output image of a projector, comprising:

projecting a set of known calibration patterns onto the display surface; sensing directly an intensity of light at each of a plurality of locations on the display surface for each calibration pattern, there being one discrete optical sensor associated with each location, and in which the optical sensor is coupled to the corresponding location by an optical fiber; and

correlating the intensities at the locations to determine correspondences between the plurality of locations and pixels in an output image of the projector.

2. (original) The method of claim 1, in which each location has known coordinates.

3. (original) The method of claim 1, in which the calibration patterns are in a form of Gray codes.

4. (original) The method of claim 1, in which the correspondences are used to determine parameters of the projector.

5 (original). The method of claim 4, in which the parameters include internal and external parameters and non-linear distortions of the projector.

6. (original) The method of claim 1, further comprising:

warping an input image to the projector according to the correspondences; and

projecting the warped input image on the display surface to appear undistorted.

7. (original) The method of claim 1, in which the projector is casually aligned with the planar display surface.

8. (original) The method of claim 1, in which the display surface is planar.

9. (original) The method of claim 1, in which the display surface is quadric.

10. (original) The method of claim 1, in which a viewer and the projector are on a same side of the display surface.

11. (original) The method of claim 8, in which the display surface is planar and a number of locations is four.

12. (original) The method of claim 1, in which the optical sensor is a photo transistor.

13. (cancelled)

14. (original) The method of claim 1, in which the intensity is quantized to zero or one.

15. (original) The method of claim 1, further comprising:

warping a sequence of input images to the projector according to the correspondences; and

projecting the warped sequence of input image on the display surface to appear undistorted as a video.

16. (original) The method of clam 15, in which the display surface and the projector are moving with respect to each other while determining the correspondences, warping the sequence of images, and projecting the warped sequence of input images.

17. (original) The method of claim 1, in which the display surface is an external surface of a 3D model of a real-world object.

18. (original) The method of claim 1, in which the display surface includes a backdrop on which the 3D model is placed.

19. (original) The method of claim 1, in which the light is infrared.

20. (original) The method of claim 1, in which each calibration image is projected as a pair, a second image of the pair being an inverse of the calibration image.

21. (original) The method of claim 1, in which the correspondences are used to relocate the projector.

22. (original) The method of claim 1, in which the correspondences are used to deform the display surface.

23. (currently amended) A system for determining correspondence between locations on a display surface having an arbitrary shape and pixels in an output image of a projector, comprising:

a display surface having a plurality of locations with known coordinates;

a plurality of known calibration patterns;

means for sensing directly an intensity of light at each of the plurality of locations on the display surface for each calibration pattern, and in which each location is optically coupled to a discrete photo sensor by an optical fiber; and

means for correlating the intensities at the locations to determine correspondences between the plurality of locations and pixels in an output image of the projector.

24. (cancelled)

25. (currently amended) The system of claim 23 ~~24~~, in which the optical fiber is located in a throughhole in the display surface.

26. (currently amended) A method for determining correspondence between locations on a display surface having an arbitrary shape and pixels in an output image of a projector, comprising:

sensing directly an intensity of light at each of a plurality of locations on a display surface for each of a plurality of calibration patterns projected on the display surface, there being one discrete optical sensor associated with each location, and in which each location is optically coupled to a discrete photo sensor by an optical fiber; and

correlating the intensities at the locations to determine correspondences between the plurality of locations and pixels in an output image of the projector.